IN THE UNITED STATES PATENT AND TRADEMARK OFFICE
BOARD OF PATENT APPEALS AND INTERFERENCES

In Re Application of:	)	
	)	
Chen, et al.	)	Confirmation No.: 9818
	)	
Serial No.: 10/810,965	)	Examiner: Trinh, Hoa B.
	)	
Filed: March 26, 2004	)	Group Art Unit: 2814
	)	
For: Novel Method to Improve Bump Reliability for Flip Chip Device	)	TKHR Docket: 252016-2530 Top-Team: 0503-A30731US

REPLY TO EXAMINER'S ANSWER

Mail Stop Appeal Brief - Patents
Commissioner of Patents and Trademarks
P.O. Box 1450
Alexandria, Virginia 22313-1450

Sir:

This is in reply to the Examiner's Answer, mailed May 1, 2007. In short, the Examiner's Answer advances, virtually word-for-word, the same rejections that were set out in the FINAL Office Action, which led to this appeal. Although the Examiner's Answer has added a few additional paragraphs in response to Applicants' arguments, the substance of the rejections have not changed. Accordingly, Applicant stands behind the arguments set forth in the Appeal Brief and kindly requests that the Board overturn the outstanding rejections.

In addition, Applicant offers the following additional comments (which respond to the Examiner's responsive paragraphs). In the paragraph of page 7, lines 10-16 of the Examiner's Answer, the Examiner asserts "Appellant's bump is made of metal. Marrs'

bump is also made of metal." Applicant respectfully traverses the Examiner's Answer for the following additional reasons.

Claim 37 recites "at least one ***solder*** compound overlying the UBM layer, wherein the solder compound comprises a flat top surface, a flat bottom surface and convex sidewalls, and the flat top surface is greater than the flat bottom surface before connecting to other components." In Col. 10, lines 1-3, Marrs discloses "both coined ball bond ***bump 312*** (FIG. 4A, 4B and 4C) and metallization 502 are made of ***gold***". In Col. 10, lines 14-16, Marrs further discloses "the resulting bond 801 is a direct ***gold to gold connection*** between coined ball bond ***bump 312*** on chip 201 and metallization 502". Thus, Marrs clearly discloses the coined ball bond ***bump 312*** is a ***gold*** bump.

For the definition of "solder", Applicant references the ASTM (American Society for Testing and Materials), which describes "***Electronic grade solder alloys*** and fluxed and non-fluxed solid solders ***for electronic soldering applications*** are not covered by this specification as they ***are under the auspices of IPC - Association Connecting Electronic Industries***." in section 1.1 of Standard B32. For the Board's convenience, a copy of the relevant portion of the ASTM is attached hereto as "Attachment A."

Likewise, in IPC-T-50G (December, 2003 by Association Connecting Electronics Industries), "solder" is defined as "A metal alloy with a melting temperature that is ***below 427°C*** [800°F]". A copy of this definition is attached hereto as "Attachment B." In the contrast, those skilled in the art would acknowledge that the melting temperature of "gold" is ***1064.18 °C***, which is beyond the definition of solder standardized by Association Connecting Electronics Industries. Thus, it is the Appellant's belief that the coined ball bond ***bump 312*** of Marrs cannot properly comprise the "***solder*** compound"

of the claimed embodiment. Therefore, Marrs fails to teach or disclose the "***solder*** compound" of the claimed embodiments.

With regard to the two attachments, Applicant submits that the attachments are not submitted for purposes of new evidence to be relied upon, but merely to reflect or confirm basic definitions of terms, as would be readily understood by persons skilled in the art (and of such clear nature that Official Notice could be taken of same).

No fee due in connection with this submission. If, however, any additional fee is deemed to be payable, you are hereby authorized to charge any such fee to deposit account 20-0778.

Respectfully submitted,

/Daniel R. McClure/

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Document Summary

ACTIVE STANDARD: B32-04 Standard Specification for Solder Metal

Developed by Subcommittee: B02.02
See Related Work by this Subcommittee
Adoptions: DOD Adopted; Building Codes;
Book of Standards Volume: 02.04

1. Scope

1.1 This specification covers solder metal alloys (commonly known as soft solde non-electronic applications, including but not limited to, tin-lead, tin-antimony, copper-silver, tin-antimony-copper-silver-nickel, tin-silver, tin-copper-silver, an silver, used for the purpose of joining together two or more metals at temperat their melting points. Electronic grade solder alloys and fluxed and non-fluxed sc electronic soldering applications are not covered by this specification as they ar auspices of IPC - Association Connecting Electronic Industries.

1.1.1 These solders include those alloys having a liquidus temperature not exce (430°C).

1.1.2 This specification includes solders in the form of solid bars, ingots, powde forms, and in the form of solid and flux-core ribbon, wire, and solder paste.

1.2 The values stated in inch-pound units are to be regarded as the standard. T given in parentheses are for information only.

1.3 *This standard does not purport to address all of the safety concerns, if any, with its use. It is the responsibility of the user of this standard to become famili hazards including those identified in the appropriate Material Safety Data Sheet product/material as provided by the manufacturer, to establish appropriate safe practices, and determine the applicability of regulatory limitations prior to use.*

2. Referenced Documents

D269 Test Method for Insoluble Matter in Rosin and Rosin Derivatives
D464 Test Methods for Saponification Number of Naval Store Products Including Other Related Products
D465 Test Methods for Acid Number of Naval Stores Products Including Tall Oil Related Products
D509 Test Methods of Sampling and Grading Rosin
E28 Test Methods for Softening Point of Resins Derived from Naval Stores by Ri Apparatus
E29 Practice for Using Significant Digits in Test Data to Determine Conformance Specifications
E46 Test Methods for Chemical Analysis of Lead- and Tin-Base Solder
E51 Method for Spectrographic Analysis of Tin Alloys by the Powder Technique
E55 Practice for Sampling Wrought Nonferrous Metals and Alloys for Determinat Chemical Composition
E87 Methods for Chemical Analysis of Lead, Tin, Antimony, and Their Alloys (Ph Method)
E88 Practice for Sampling Nonferrous Metals and Alloys in Cast Form for Detern Chemical Composition

Attachment 1

MIL-STD-129 Marking for Shipment and Storage
Fed. Std. No. 123 Marking for Shipment (Civil Agencies)

Index Terms

bar; flux; flux cored solder; ingot; lead-silver alloys; lead-tin alloys; lead-tin-sil powder; ribbon; solder alloy; solder metal; solder uses; tin-antimony alloys; tir tin-silver alloys; wire; 77.120.40

Citing ASTM Standards

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. ASTMCOLLECTION ACTIVE B32 DESIGNATION B32 DESIGNATION B32 DESIGNATION B32 DESIGNATION B32 B32 B32 B32 B32 B32 B32 B32 B32

Attachment 1

Skin Effect **21.0946**

The increase in resistance of a conductor at microwave frequencies that is caused by the tendency of electric current to concentrate at the conductor's surface.

Skip Via **22.2036**

A via that directly connects conductive layers of build-up/HDI layers that are not adjacent with each other.

Skipping **52.0947**

When a coating or resist does not cover the spaces between adjacent conductors.

Slice **35.0949**

See "Wafer."

Sliver **96.0950**

A slender portion of plating overhang that is partially or completely separated from a conductor edge.

Slump **73.0951**

The distance that a substance, e.g., adhesive, moves after it has been applied.

Smaller-the-Better Characteristic **91.1817**

A parameter of quality that improves performance as its value decreases. (See also "Larger-the-Better Characteristic" and "Nominal-is-Best Characteristic.")

Smear Removal **54.0953**

See "Desmear."

Smeared Bond **74.0952**

A bond impression that has been distorted or enlarged by excess lateral movement of the bonding tool or holding device fixture.

Socket Contact **37.0954**

A female connector contact.

Soft Error **35.2037**

A temporary electrical state error in a circuit caused by a transient event.

Solarization **24.0955**

A decrease in density with increased exposure.

Solder **46.0956**

A metal alloy with a melting temperature that is below 427 °C [800 °F].

Solder Ball **75.0959**

A small sphere of solder adhering to a laminate, resist, or conductor surface. (This generally occurs after wave solder or reflow soldering.)

Solder Bath **75.1767**

A container or vessel of molten solder into which component parts or assemblies are immersed.

Solder Bridging **75.0960**

The unwanted formation of a conductive path of solder between conductors.

Solder Bump **74.0961**

A round ball of solder used to make interconnections between a flip-chip component and a base material during controlled-collapse soldering.

Solder Coat **53.0962**

A layer of solder that is applied directly from a molten solder bath to a conductive pattern.

Solder Connection **75.0963**

A metallurgical connection serving electrical/mechanical/thermal functions that employs solder for the joining of two or more metal surfaces. (See also "Cold Solder Connection," "Disturbed Solder Connection," "Excess Solder Connection," "Insufficient Solder Connection," "Overheated Solder Connection," "Preferred Solder Connection," and "Solder Connection Pinhole.")

Solder Connection Pinhole **75.0964**

A small hole that penetrates from the surface of a solder connection to a void of indeterminate size within the solder connection.

Solder Contact **37.2039**

A type of connector contact whose nonmating end is in the form of a hollow cylinder, cup, eyelet, or hook that can be soldered to a wire in contact with it.

Solder Cream **46.0965**

See "Solder Paste."

Solder Destination Side **73.2040**

The side of the printed board or mounting structure that the solder flows toward.

Solder Dissolution **70.2041**

A phenomenon whereby metals (i.e., Ag, Pcl. Co) are dissolved in the solder.

Solder Embrittlement **75.0966**

The reduction in mechanical properties of a metal as a result of local penetration of solder along grain boundaries.

Solder Fillet **75.0967**

Solder, with a normally concave surface, that is at the intersection of the metal surfaces of the solder connection.

Attachment 2